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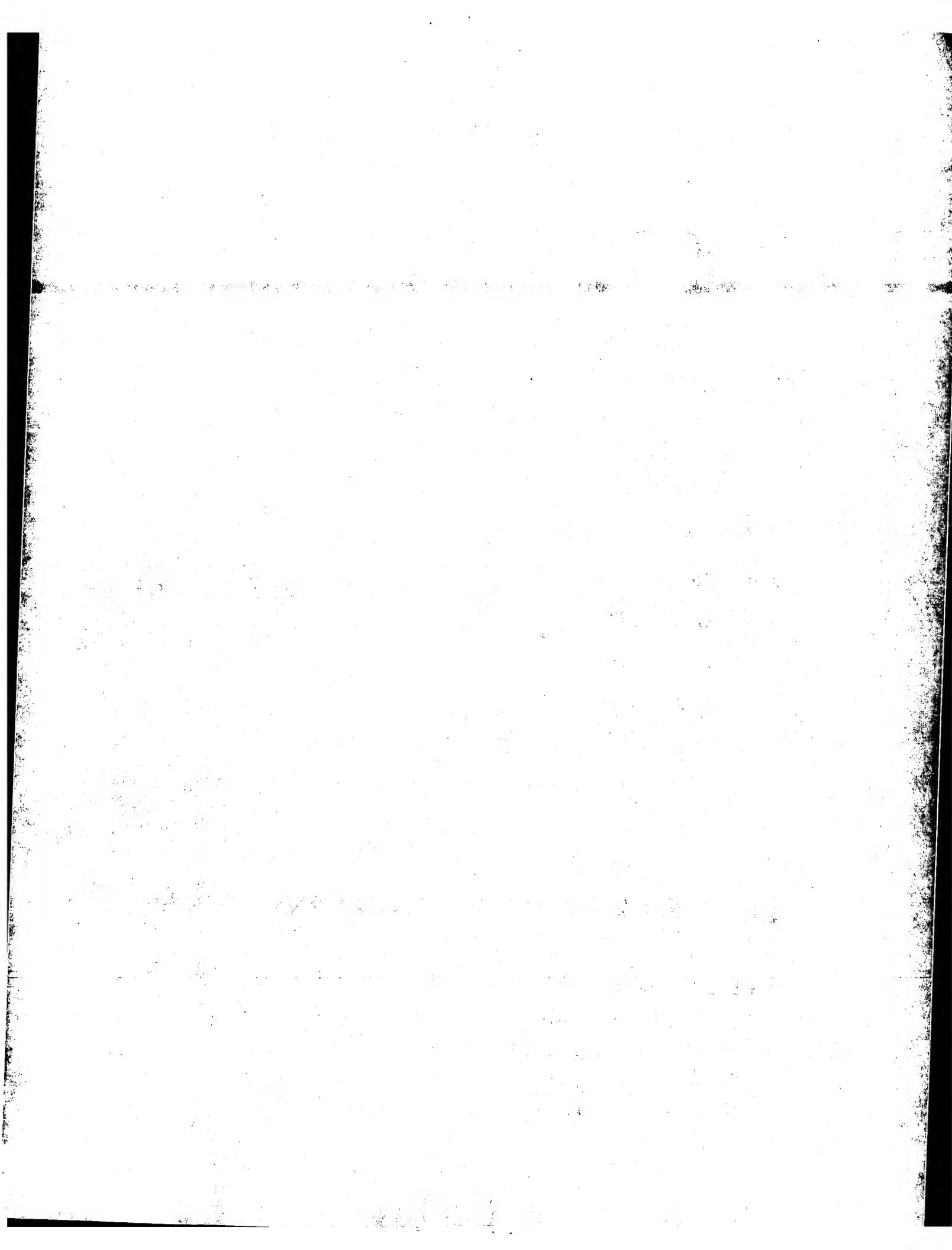
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Smart Card

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Stage 1 Description

6

(Version 1.1)

7

May 22, 1996

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CDMA Development Group

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Smart Card Team Document

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1

2 1. Introduction

3 This document presents Stage 1 descriptions for CDMA smart card services. The intent
4 of this document is to provide inputs on user considerations, and possible service
5 interactions to aid in the development of smart card services and other layer associated
6 capabilities.

7 Smart card functionality includes:

8 • Privacy key management and authentication interface between the subscriber
9 and the CDMA mobile station

10 • Personalized feature subscription record

11 • Transport of non-telephony applications, e.g. credit card, electronic coin purse
12 and loyalty program

13 • Remote management of data/voice/facsimile applications.

14 Smart card applications are identified below:

15 • Pre-paid Services

16 • Plastic Roaming

17 • Fraud Prevention

18 • Future applications: Portable Storage and Non-telephony Services

19 It is assumed one card per subscription at the initial stage. Ultimately, there can be
20 multiple cards per subscriber and the smart card can enable the wireless data/voice
21 services as the transport mechanism underlying non-telephony, end-to-end applications.

22 With the above functions and applications, service providers will be able to realize the
23 following benefits:

24 1) Service offers with billing and provisioning capabilities through an
25 intelligent/synergistic mechanism.

26 2) Common/flexible means for billing and provisioning cross wireline, wireless, and
27 cable TV services.

28 3) Plastic roaming cross different access technology networks.

1 4) Service portability for subscribers, subscriptions, network technologies, and service providers.

2

3 5) Marketing differentiation - Brand exposure, expanded distribution channels, advertising revenues, customer loyalty programs.

4

5 6) Billing and customer care alternatives - Fraud protection/management, ease of distribution, remote activation alternative.

6

7 7) Cheaper to subsidize if needed: cost per card is much cheaper than cost per mobile station.

8

9 8) Revenue assurance with pre-paid service.

10 The smart card can bring the following benefits to the subscribers:

11 1) Convenience for international business travel with rental mobile stations.

12 2) Domestic travel to areas with different network technology.

13 3) Public mobile stations with individual billing report.

14 4) Employees can share mobile stations with personalized privileges and accounting.

15 5) Family members can share a mobile station with cards tailored to specific needs and individual accounting.

16

17 6) It is easier to carry a plastic card than a mobile station.

18

19 7) Theft-proof : a smart card can not be used without a CHV verification and other security mechanism built in the network, e.g. IS-41 CAVE, etc.

20 8) Effective fraud control and prevention.

21

2. References

3. 2.1. References for Smart Card Services

5 **International Standards Organization (ISO) 7816-1,2,3-6 Information**
6 **technology - Identification cards - Integrated circuit(s) cards with contact parts**
7 **1 through 6**

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10 **Network (ISDN) General Structure and Service Capabilities; Recommendations**
11 **I.110 - I.257.**

12 **Technical Specification GSM 02.17: Subscriber Identity Module, Functional**
13 **Characteristics; August 31, 1993.**

14 **Technical Specification GSM 11.11: Specification of the Subscriber Identity**
15 **Module - Mobile Equipment (SIM - ME) interface; October 1993.**

16 **J-STD-007, PCS 1900 Smartcard - ANSI Standard**

17 **J-STD-008-1995, Personal Station-Base Station Compatibility**

18 **ANSI Requirements for 1.8 to 2.0 GHz Code Division Multiple Access (CDMA)**

19 **Personal Communications Systems , Telecommunications Industry Association,**
20 **1995.**

21 **TIA/EIA/IS-41-C, Cellular Radio-Telecommunications Intersystem Operations,**
22 **Telecommunications Industry Association, December 1995.**

23 **TIA/EIA/IS-95-A, Mobile Station-Base Station Compatibility Standard for Dual-**
24 **Mode Wideband Spread Spectrum Cellular System, Telecommunications Industry**
25 **Association, May 1995.**

26 **TIA/EIA/IS-95-A, Appendix A, Message Encryption and Voice Privacy. An ITAR**
27 **controlled document subject to restricted distribution. Contact the**
28 **Telecommunications Industry Association, Washington, D.C., November 16, 1994.**

29 **TSB50, User Interface for Authentication Key Entry, Telecommunications**
30 **Industry Association, March 1993.**

31 **TSB74, Support for 14.4 kbps Data Rates and PCS Interaction for Wideband**
32 **Spread Spectrum Cellular Systems, Telecommunications Industry Association,**
33 **December 1995.**

1

2 **3. Definitions**

3 **Authentication** - A secure procedure used to validate a mobile station's identity
4 involving the A-key and the CAVE Algorithm.

5 **Authentication Center** - An entity that manages the authentication information related
6 to the mobile station.

7 **Authentication Key (A-key)** - A secret 64-bit pattern stored in the subscriber unit. It is
8 used to generate and update the subscriber unit's Shared Secret Data. The A-key is used
9 in the authentication process.

10 **Authenticating Network** - Networks that validate a subscriber through authentication.

11 **Authorized Dealer** - An agent that is authorized by a service provider to sell that
12 service provider's product or service to a customer.

13 **Automatic Teller Machine (ATM)**

14 **Call** - A temporary communication between telecommunications users for the purpose of
15 exchanging information. A call includes the sequence of events that allocates and
16 assigns resources and signaling channels required to establish a communications
17 connection.

18 **Card Holder Verification (CHV)** - Access condition used by the SIM for the
19 verification of the identity of the user.

20 **Cellular Service Provider** - A licensee of the responsible government agency (in the
21 U.S., a licensee of the Federal Communications Commission) authorized to provide
22 Cellular Radiotelephone Service.

23 **Code Division Multiple Access (CDMA)** - A technique for spread-spectrum multiple-
24 access digital communications that creates channels through the use of unique code
25 sequences.

26 **Country Code** - A unique 1-, 2- or 3-digit code assigned to countries in the World
27 Numbering Plan. For international dialing purposes, the world is divided into nine
28 zones. The first digit of a country code is the world number.

29 **Customer** - A person who purchases a mobile station and is a prospective subscriber to
30 a cellular service provider.

31 **Customer Service Center** - An entity of a service provider that provides user support
32 and assistance to subscribers.

33 **Customer Service Representative** - A person that operates from a customer service
34 center and provides user support and assistance to subscribers.

35 **DMH - Data Message Handler**

36 **Digits** - Digits consist of decimal integers 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9.

37 **Distribution Channel** - A method for providing a product or service to a specific
38 market.

39 **Directory Number** - The phone number used to dial a subscriber.

40 **Dual-mode Mobile Station** - A mobile station capable of analog or digital operation.

41 **Electronic Serial Number (ESN)** - A 32-bit number assigned by the mobile station
42 manufacturer used to identify a mobile station. The ESN is unique for each legitimate
43 mobile station.

44 **Home Location Register (HLR)** - The location register or database to which a MIN is
45 assigned for record purposes such as subscriber information.

46 **International Mobile System Identification (IMSI)** - The information which uniquely
47 identifies a subscriber to the PSTN or PLMN.

48 **Mobile Identification Number (MIN)** - The 10-digit number that represents the phone
49 number of the subscriber unit.

1 **Mobile Station (MS)** - The mobile or portable subscriber radio telephone equipment
2 (same as Cellular Subscriber Station).
3 **Mobile Switching Center (MSC)** - A configuration of equipment that provides cellular
4 radiotelephone service.
5 **National Number** - The number identifying a subscriber line or terminal within an area
6 designated by a country code.
7 **Network** - The telecommunications equipment that has any part in processing a call or
8 a supplementary service for the subscriber referred to. It may include local exchangers
9 and transit exchanges, but does not include the mobile station and is not limited to the
10 "public network" or any other particular set of equipment.
11 **NDSS** - Network Directed Systems Selection
12 **Numeric Assignment Module (NAM)** - The electronic memory module of the
13 subscriber unit where the MIN and other subscriber specific parameters are stored.
14 Subscriber units that have multi-NAM features offer users the option of using their units
15 in several different markets by registering with a local number in each location.
16 **OTASP** - Over-the-Air Service Provisioning
17 **PCS** - Personal Communication Services
18 **Personal Identification Number (PIN)** - A string of digits used to validate a
19 subscriber's identity. In order to distinguish the PIN from the de-registration or de-
20 activation feature codes using a Modifier Digit "0," the PIN shall not start with the
21 digit 0. The PIN shall be at least 4 digits and shall not have too many repeated digits.
22 (e.g., no more than 2).
23 **Portability** - The ability for a smart card to operate in a variety of smart card compatible
24 terminals.
25 **PLMN** - Public Land Mobile Network
26 **PSTN** - Public Switch Telephone Network
27 **Registration** - Method by which a mobile station notifies the network of its location and
28 parameters.
29 **Roamer** - A mobile station operating in a cellular system or network other than the
30 one from which service is subscribed.
31 **Roamer Service Profile** - The specific set of features, capabilities and/or operating
32 restrictions, other than financial accountability, associated with the subscriber.
33 **Service Provider** - A company, organization, business, etc. which sells, administers,
34 maintains, and charges for the service. The service provider may or may not be the
35 provider of the network.
36 **Shared Secret Data(SSD)** - A 128-bit pattern stored in the mobile station (in semi-
37 permanent memory) and known by the network. The SSD is a concatenation of two 64-
38 bit subsets: SSD_A which is used to support the authentication procedures and SSD_B
39 which serves as one of the inputs to the process generating the encryption mask.
40 **Subscriber Identification Module (SIM)** - The SIM card is the Subscriber Identity
41 Module. It contains necessary information to verify and authenticate the subscriber.
42 There are two sizes, full size and plug-in.
43 **Smart Card Serial Number** - In order for the service providers to identify the smart
44 card, there needs to be a smart card serial number. This is a unique number that
45 identifies the smart card. It can be printed on the card. It is not secret data, it is not sent
46 over the air.
47 **Stage 1** - This stage is part of the overall method used to characterize
48 telecommunication services. Stage 1 defines the service aspects of a capability.
49 Specifically, Stage 1 provides a service description of a telecommunication service from
50 the user point of view (refer to CCITT Recommendation I.130).
51 **Stage 2** - This stage is part of the overall method used to characterize
52 telecommunication services. Stage 2 defines the functional aspects of a capability.
53 Specifically, Stage 2 provides a description of the functions at the user-network interface

1 and inside the network between network elements (refer to *CCITT Recommendation*
2 *I.130*).

3 Stage 3 - This stage is part of the overall method used to characterize
4 telecommunication services. Stage 3 defines the network implementation aspects of a
5 capability. Specifically, Stage 3 provides a description of the actual protocols and
6 formats used to develop the telecommunication service (refer to *CCITT*
7 *Recommendation I.130*).

8 **Subscriber** - A person authorized for a feature or service.

9 **Subscriber unit (SU)** - The portion of the mobile or portable subscriber radiotelephone
10 equipment that contains the unique information to identify a subscriber. The SU can be
11 the entire mobile station itself, or a smart card or other device that contains such
12 information.

13 **Universal Identification Module (UIM)** - This term is used in T1P1.3 to refer to the
14 logic function or the SIM card in the mobile station.

15 **World Numbering Plan** - A plan created by the CCITT that provides each telephone
16 subscriber with a unique number. Each world telephone number consists of a country
17 code followed by the national number as defined in *CCITT Recommendations E.164*. By
18 international agreement, the number of digits in the country code plus national number
19 is limited to a tOTASPI of 12 digits currently, with a recommendation to increase the
20 maximum length to 15 digits by the end of 1996.

21 **Validation** - The process by which a subscriber is authorized to access and use a cellular
22 network.

23 **Verification** - The method used by a service provider to determine the credit of a new
24 subscriber.

25

26 **4. Global Feature Description**

27 Upon the receipt of a smart card from a service provider, the subscriber shall be
28 responsible for inserting the smart card into a mobile station or a smart card compatible
29 device.

30 The subscriber with a smart card may have to subject to Card Holder Verification (CHV)
31 (e.g. use of a Personal Identification Number - PIN) in order to access voice/data
32 applications. Each smart card shall have a CHV to secure card access. Use of CHV is
33 implementation specific.

34 The subscriber may use a single smart card containing multiple applications in multiple
35 smart card compatible devices, provided the device supports the particular application.
36 For example, a multi-application card supporting a telephony and a banking application
37 may be successfully used in both a mobile station and an ATM-type machine.

38 The smart card can be removed from the mobile station when not in use. The size of a
39 smart card does not have to be smaller than the mobile station as long as a compatible
40 interface is provided. Full size smart cards are preferred because they can be removed
41 from the mobile station and stored elsewhere with other payment type cards and used for
42 other horizontal applications.

43 A normal phone call should not be allowed without the smart card present in the mobile
44 station. There are exceptions to this case which will be determined and authorized by the

1 service provider. Examples are emergency 911 calls, calls to update the value of the
2 individual account, 800 calls, service order calls, etc. When the smart card is inserted,
3 the mobile station can be powered up manually or automatically.

4 It is assumed one card per subscription in this document.

5 5. Smart Card Feature Descriptions

6 The following sections describe individual smart card features and services.

7 5.1. Pre-paid Service

8 Pre-paid subscription will provide an attractive payment option to service providers as
9 well as to a large segment of the customers because it can provide a means for "cash
10 economy" and for poor credit, high risk customers to obtain wireless service.
11

12 A smart card can be used to support pre-paid subscription similar to a debit card. The
13 subscriber can pay cash or link the smart card to an authorized credit card institute. The
14 activation of smart card can be done at home through phone via OTA, at an ATM
15 machine, at a service center or other convenient stores equipped with the appropriate,
16 secured terminal. The distribution of the smart card can be handled through regular
17 mail, so can the "refill" mechanism.

18 A unit amount, in dollars or minutes, representing purchased air time may be stored on
19 a smart card. The user may make and receive phone calls, and use network services. The
20 value on the smart card will be decremented as the authorized subscriber makes phone
21 calls until the value of the card is exhausted. The subscriber may replenish the card by
22 purchasing additional units. The service provider may offer a variety of rate plans and
23 provision the smart card according to the subscriber's choice. After provisioning, the
24 card value can only be decremented as phone calls are made.

25 The value of the card can only be incremented through an authorized party or process to
26 avoid illegal tempering. The value filled in the smart card can be re-adjusted per
27 subscriber's request through the pre-arranged authorization process supported by the
28 service provider.

29 The smart card may be used to track value off-line, i.e. without network involvement.
30 The subscriber may request to have balance and other relevant call detailed records
31 displayed in the window provided on a mobile station.

32 Once the value on the smart card is depleted, the customer can not make normal phone
33 calls except specified by the service provider. These allowable free calls can include 911
34 emergency calls, 800 calls, or subscription related calls such as 411, 611, etc. to update
35 the value and privileges carried by the card subscriber.

1 The smart card provisioning process, i.e., subscriber provisioning has to be automated
2 with sufficient tools (OTASP and/or SIM application toolkit) to warrant an operation
3 above and beyond the conventional existing plastic calling cards with or without the
4 magnetic stripes. Manual operations to update individual subscriber databases are not
5 acceptable by the service provider.

6 A subscriber scenario is described as follows: An automated kiosk at a neighborhood
7 convenience store may accept cash, debit or credit cards in payment for added telecom
8 units. The subscriber inserts cash or swipes a debit or credit card, indicates the value of
9 the purchase, then receives a smart card for equal replenishment. Alternatively, the
10 subscriber's service may be call-diverted to a customer service representative for the
11 purchase of additional units. The customer service representative may replenish the
12 smart card value via Over-the-Air Service Provisioning administration, or other
13 automated procedures. The service provider can also mail the smart card to the
14 subscriber for a newly established amount and a feature set.

15 The Pre-Paid Service should allow the service provider to better administer customer
16 credit control, mass market penetration and acceptance of temporary or short term
17 subscribers. This capability should make it possible for service providers to implement
18 various billing strategies, such as mobile originated or mobile terminated limitations, as
19 well as subscriber deletion without making major modifications to their networks.
20 Eventually the smart card should carry individual billing information such as advice of
21 charge.

22 Initially, a simplified Pre-paid Service with minimum impact on the network should be
23 made available for the service provider to offer this service quickly. Later, a full
24 capability of the Pre-paid service should be accommodated. This full capability is
25 characterized as follows:

26 The residual value on a smart card should be dealt with fairly. A message should be
27 delivered to the subscriber indicating insufficient value to make the next call. Options
28 should be informed.

29 Examples of optional steps can be:

- 30 1. Call the service center to receive changes;
- 31 2. Call the service center to grant more value;
- 32 3. Enter a card terminal to receive value equivalent to additional cash payment;
- 33 4. Authorize usage of credit account to extend usage;
- 34 5. Receive a new card from a service center or in mail.

35 These options will be adopted according to the type of smart card as explained below:

- 36 1. Throwaway smart card. After credit amount and/or time expires, the smart card is
37 permanently disposed of for making phone calls.

1 2. Rechargeable smart card. The service provider can define circumstances by which
2 customers are able to recharge their smart cards with additional payments.

3 3. Upgrade from prepaid to credit card. This will allow the subscriber to use post
4 payment service as it is typically the case after completing a successful credit check.

5

6 Some tentative attributes and anticipated values are provided below:

Attribute	Value
Account balance	Assume \$0 - \$10,000, allowable per Service Provider
Rate set preferences	Assume maximum 100 rate plans
Accumulative call meter	
Advice of charge	
Currency exchange rate	Exchange rate of major currencies
OTASP	Over the Air Service Provisioning
DMH link	Tie to the near real time billing data
CHV Authorization	CHV, ESN and MIN combination

7

5.1.1. Normal Procedures With Successful Outcome

5.1.1.1. Authorization

10 Pre-paid Service may be provided after pre-arrangement with the service provider, or
11 may be made generally available by the service provider.

5.1.1.2. De-Authorization

13 If Pre-paid Service is provided after pre-arrangement with the service provider, the
14 service shall be de-authorized at the subscriber's request or for administrative reasons.

5.1.1.3. Registration

16 Pre-paid Service should allow registration of the smart card either through the
17 terminal/mobile station or through the network.

1 **5.1.1.4. De-Registration**

2 Pre-paid Service does not have to have De-Registration.

3 **5.1.1.5. Activation**

4 Pre-paid Service shall be activated upon authorization.

5 **5.1.1.6. Deactivation**

6 Pre-paid Service shall be de-activated upon De-Authorization.

7 **5.1.1.7. Invocation**

8 Pre-paid Service is invoked by issuing of the appropriate application level commands.

9 **5.1.2. Exception Procedures or Unsuccessful Outcome**

10 If the card is warped or damaged, the card can not trigger any service, replacement will
11 be sought. If card access by an unauthorized user is detected through CHV or other
12 security verification, the call will be denied.

13 **5.1.2.1. Registration**

14 None identified.

15 **5.1.2.2. De-Registration**

16 None identified.

17 **5.1.2.3. Activation**

18 None Identified.

19 **5.1.2.4. Deactivation**

20 None Identified.

21 **5.1.2.5. Invocation**

22 If Pre-paid Service cannot be established for the service session or if the service sessions
23 are interrupted in progress, the network may clear the service session. The originator of
24 the service session should be provided with an indication that the service session has
25 failed.

1 **5.1.2.6. Exceptions While Roaming**

2 None identified.

3 **5.1.2.7. Exceptions During Intersystem Hand-off**

4 Intersystem hand-off should not affect Pre-paid Service integrity.

5 **5.1.3. Alternate Procedures**

6 None identified.

7 **5.1.4. Interactions With Other Wireless Services**

8 **5.1.4.1.**

9 For Further Study

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2 **5.2. Plastic Roaming Service**

3 Plastic Roaming Service will allow a user to roam outside of his/her home system
4 through the use of a smart card. This service will provide the capability of allowing the
5 user to authenticate with a preferred roaming system which has been previously defined
6 on the smart card.

7 The smart card will contain a list of preferred serving systems that would associate the
8 name/greeting of the service provider the subscriber is roaming on. When a subscriber
9 selects a preferred serving system, the name and greeting of the local service provider
10 may be delivered to the subscriber. This list will provide the subscriber greater
11 flexibility of maintaining his/her most frequently visited location.

12 A smart card service provider may issue provided support of multiple technology
13 imprinted on the card. The service provider that has more than one type of technology
14 to offer to its cellular or PCS subscribers will have the capability of providing extended
15 roaming access on the same smart card. If a smart card subscriber is unable to access a
16 particular network technology, he/she may choose to disconnect from the network and
17 reconnect with another network technology.

18 The smart card must be inserted into a smart card terminal unit at all times while plastic
19 roaming. The smart card prepersonalization data must be verified and validated before
20 plastic roaming can occur. After registration the service provider may access the
21 roamer service profile. The roamer service profile may store and maintain the specific
22 feature information (e.g. automatic roaming, NDSS, etc.) for call origination and
23 termination

24 Smart card location information and time of call would provide geographical roaming
25 information for call origination and termination. These characteristics should be used to
26 facilitate billing functions via the home service provider.

27 Ultimately, the smart card should allow roaming across multiple bands (800, 900, 1800,
28 1900 MHz, etc.) and multiple access technologies (PCS, CDMA, GSM, AMPS, TDMA
29 etc.)

30

Attribute	Value
Prepersonalization data	Authentication key, IMSI, status of card(block, unblock), CHV
IMSI	International Mobile Station Identification
TMSI	Temporary Mobile Station Identification
LAI	Location Area Information (SID/NID)
Time	Time related to periodic location updating
Roamer Service Profile	Automatic roaming, SSPR, NDSS, CW, CFB, 3WC, etc.
Extended Network Technology Access	Provide interoperability with other networks (GSM, CDMA, PCS, AMPS, TDMA)
OTASP	Over the Air Service Provisioning
SID/NID	List of preferred Systems/Network ID provided by the home system
Feature Codes	Automatic roaming, SSPR, NDSS

1

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5.2.1. Normal Procedures With Successful Outcome

3

5.2.1.1. Authorization

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5
6

Plastic Roaming Service may be provided after pre-arrangement with the service provider, or may be made generally available by the service provider. The smart card subscriber prepersonalization data would be imprinted on the card at authorization.

7

5.2.1.2. De-Authorization

8
9
10

If Plastic Roaming Service is provided after pre-arrangement with the service provider, the service shall be de-authorized at the subscriber's request or for administrative reasons.

11

5.2.1.3. Registration

12

Plastic Roaming Service has no registration. The mobile station handles registration.

1 **5.2.1.4. De-Registration**

2 Plastic Roaming Service has no De-Registration.

3 **5.2.1.5. Activation**

4 Plastic Roaming Service shall be activated upon authorization.

5 **5.2.1.6. Deactivation**

6 Plastic Roaming Service shall be de-activated upon De-Authorization.

7 **5.2.1.7. Invocation**

8 Plastic Roaming Service is invoked by the smart card user inserting the smart card into
9 the mobile station or smart card compatible device. The user may enter a CHV for
10 verification to access the smart card roamer service profile and other applications.

11 **5.2.2. Exception Procedures or Unsuccessful Outcome**

12 **5.2.2.1. Registration**

13 None identified.

14 **5.2.2.2. De-Registration**

15 None identified.

16 **5.2.2.3. Activation**

17 None Identified.

18 **5.2.2.4. Deactivation**

19 None Identified.

20 **5.2.2.5. Invocation**

21 If Plastic Roaming Service cannot be established for the service session or if the service
22 sessions are interrupted in progress, the network may clear the service session. The
23 originator of the service session should be provided an indication that the service session
24 has failed.

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5.2.2.6. Exceptions While Roaming

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If plastic roaming service cannot be established or a service session fails while roaming, the originator has the option of reconnecting to another extended network technology. Reconnection would occur after the originator has disconnected from the current extended network technology he/she is on and re-register with another extended network.

7

5.2.2.7. Exceptions During Intersystem Hand-off

8

Intersystem hand-off should not affect Plastic Roaming Service integrity.

9

5.2.3. Alternate Procedures

10

None identified.

11

5.2.4. Interactions With Other Wireless Services

12

5.2.4.1.

13

For Further Study

14

5.3. Fraud Prevention Service

The smart card provides mechanisms that assure a high degree of privacy and authentication. This privacy and authentication function is the basis for all other smart card services. This function should be compliant with the existing UIM authentication and privacy specification for the PCS applications (ref. T1P1.3.)

The Fraud Prevention Service provides the following measures:

1. Preventing cloning of subscriptions by:
 - Securing the distribution of subscriber data
 - Secure storage on the smart card
 - No programming of phone (at distribution) with sensitive data

2. Authentication:
 - User to SIM (subscription) with CHV/PIN
 - SIM (subscription) to network with secret keys and algorithms

3. Safeguarding subscriber anonymity because:
 - The average interceptor cannot tell who is using the phone (TIMSI), nor can the interceptor track the user.

4. Encryption of:
 - all signaling data and
 - all communications content (voice, data, etc.)

The smart card will handle multiple security algorithms including IS-41 and GSM based algorithms.

The smart card will be used in conjunction with the conventional CHV code. Subscriber fraud should be drastically reduced with the smart card due to the fact that the keys and the algorithm execution is performed within a secure environment of a single chip. At no time does secret data or intermediate algorithmic results leave this secure environment.

The smart card authentication will be handled either by the network or the compatible terminal/mobile station. The smart card needs to operate with networks that can/will handle authentication as well as those that can/will not. Depending on the network authentication capability, the proper combination of the CHV, A-key, MIN (or IMSI) and the ESN of the mobile station will be validated for a particular subscriber to assure maximum authentication. The subscriber security identity is portable with the card and the subscriber across all smart card capable mobile stations.

The smart card will enable the service provider to process authentication key with secured distribution and management. It should complement security functions supplied by the OTASP.

Attribute	Value
Authentication key	
Authentication algorithm	
OTASP authentication responses	

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5.3.1. Normal Procedures With Successful Outcome

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5.3.1.1. Authorization

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6

Fraud Prevention Service may be provided after pre-arrangement with the service provider, or may be made generally available by the service provider.

7

The three categories of Fraud Prevention may be authorized as follows:

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12

1. CHV code, is initially always enabled. The user can disable and enable this service at will. However pre-paid cards will always need a CHV code before attempting a call setup. The CHV will be administrated by the service provider in conjunction with different levels of security. The subscriber can access and change only the CHV, not other security algorithms involving A-key, etc.

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2. Authentication is mandatory. The A-key or similar parameters may be stored on a UIM together with an authentication algorithm.

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3. Encryption prevents subscription data from being illegally captured and used. Encryption shall always be used whenever available.

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5.3.1.2. De-Authorization

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If Fraud Prevention Service is provided after pre-arrangement with the service provider, the service shall be de-authorized at the subscriber's request or for administrative reasons. The Fraud Prevention Service is provided until termination of entire telephone service at the subscriber's request or for administrative reasons.

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2 **5.3.1.3. Registration**

3 Fraud Prevention Service has no registration.

4 **5.3.1.4. De-Registration**

5 Fraud Prevention Service has no De-Registration

6 **5.3.1.5. Activation**

7 Fraud Prevention Service shall be activated upon authorization.

8 **5.3.1.6. Deactivation**

9 Fraud Prevention Service shall be de-activated upon De-Authorization.

10 **5.3.1.7. Invocation**

11 Fraud Prevention Service is invoked by issuing of the appropriate application level
12 commands.

13 The three categories Fraud Prevention will be invoked:

- 14 1. CHV code is invoked by issuing of the appropriate application level commands.
- 15 2. Authentication is invoked by the MS or by the network.
- 16 3. Encryption is invoked by issuing of the appropriate application level commands.

17 **5.3.2. Exception Procedures or Unsuccessful Outcome**

18 **5.3.2.1. Registration**

19 None identified.

20 **5.3.2.2. De-Registration**

21 None identified.

22 **5.3.2.3. Activation**

23 None Identified.

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5.3.2.4. Deactivation

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None Identified.

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5.3.2.5. Invocation

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If Fraud Prevention Service cannot be established for the service session or if the service sessions are interrupted in progress, the network may clear the service session. The originator of the service session should be provided an indication that the service session has failed.

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5.3.2.6. Exceptions While Roaming

9

None identified.

10

5.3.2.7. Exceptions During Intersystem Hand-off

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Intersystem hand-off should not affect the Fraud Prevention Service integrity.

12

5.3.3. Alternate Procedures

13

None identified.

14

5.3.4. Interactions With Other Wireless Services

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5.3.4.1.

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Fraud Prevention Service is the foundation block to all the other services. This service will interact with other services at the beginning of the call set-up. More study is necessary.

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2 **5.4. Future Services**

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4 **5.4.1. Portable Storage Service**

5 Mapping of feature codes and other subscriber specific data to more user-friendly
 6 interface can be done in the smart card. Data stored in the smart card can be carried
 7 with the subscriber for activation in other location, device, or network. Examples of
 8 these data are listed below:

- 9 1) Translation of 911 to the number appropriate for a specific geographic location.
- 10 2) Service provider's name/greeting associated with certain SID/NID. When subscriber
 11 places a call in a new SID/NID, name and greeting of the local service provider can be
 12 delivered to the subscriber.
- 13 3) Voice print of the subscriber.
- 14 4) Audio characteristics.
- 15 5) Short messages, voice and facsimile messages delivered to the subscriber.
- 16 6) Personal health data, education and entertainment preferences.
- 17 7) Business specific application of data per employee, e.g. dispatch route assignments
 18 for driver X, etc.

Attribute	Value
Feature codes	
SID/NID list	
Voice print	
Audio signature	
Short messages	
Voice messages	
Facsimile messages	
Route information	
Personal health record	
Entertainment data	
OTASP	
CHV	

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2 5.4.2. Non-telephony Services

3 Many current and proposed smart card applications address industries and consumer
4 needs outside of telephony. A link to these services can be provided by the smart card
5 which will allow telephony and non-telephony applications to co-exist on the same card.
6 For example:

7 1) Transparent wireless transport for "end-to-end" applications facilitating interaction
8 between the smart card and another entity, e.g. a host machine.

9 2) Business alliance between financial institution and the wireless service provider can
10 link telephony and credit services via the smart card.

11 A telephony application on the smart card may provide wireless access to supply
12 communication needs of another application also on that smart card. However, a number
13 of these applications rely upon some form of transport to enable communications with a
14 host application or database. For example, a financial services smart card enabling
15 banking transactions might require access to host applications for funds transfer,
16 payment and account updates. A multi-application smart card containing both a
17 financial services and wireless services application could provide the required
18 communications transport services. The user inserts the smart card into the mobile
19 station, enters the appropriate CHV, then selects the desired financial services
20 application from an application menu. User information and transaction data could be
21 transmitted via SMS , voice or data channel from the smart card to the recipient
22 application and vice versa. The user physically interacts only with the mobile station. ,

Attribute	Value
Application name	
Transport protocol	
CHV	
Application detailed billing	
SMS	

23

